Mathematics: Pure Mathematics 20
Grade: 10, 11, 12
Basic
WCP

Student and teacher: Use this cover sheet for maili

ASSIGNMENT BOOKLET

MAT 2037 Pure Mathematics 20
Module 4

FOR STUDENT USE ONLY

Date Module Submitted: ____________________

Time Spent on Module: ____________________

(If label is missing or incorrect)

File Number: ____________________

Module Number: ____________________

FOR TEACHER USE ONLY

Assigned Teacher: ____________________

Module Grading: ____________________

Graded by: ____________________

Date Module Received: ____________________

Module Assignment Recorded: ____________________

Student's Questions and Comments

Apply Module Label Here

Name

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Teacher's Comments

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Teacher

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- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

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Pure MATHEMATICS 20

Module 4
Functions
ASSIGNMENT BOOKLET

Learning
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Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	30	
Section 2 Assignment	25	
Section 3 Assignment	30	
Final Module Assignment	15	
	100	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Pure Mathematics 20
Assignment Booklet
Module 4
Functions
Learning Technologies Branch
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ASSIGNMENT BOOKLET
PURE MATHEMATICS 20 – MODULE 4: FUNCTIONS

Your mark on this module will be determined by how well you do your assignments in this booklet.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate section.

There are three section assignments and one final module assignment in this Assignment Booklet. The total value of these assignments is 100 marks. The value of each assignment is stated in the left margin.

Be sure to proofread each assignment carefully.

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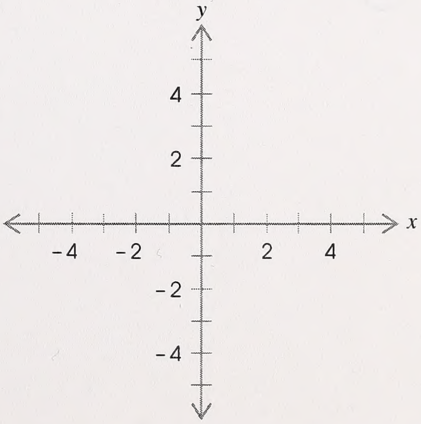
Section 1 Assignment: Polynomial Functions

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

② **1.** Is $f(x)=\frac{\pi}{4}x^3-\sqrt{2}x+4$ an example of a polynomial function? Why or why not?

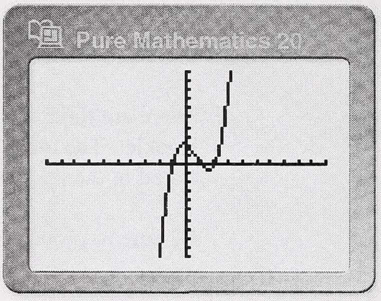
2. Graph $y=x^4-4x^2$ on your graphing calculator.

② **a.** Sketch the graph that you obtain on the following grid.



② **b.** What are the domain and range of this function?

④ **3.** Using the standard window settings, Sara graphed a cubic function on her graphing calculator. The display on the right appeared on her calculator.



The function she entered was of the form $y = x^3 + mx^2 + nx + 2$. Assuming that the zeros of this function are integers, determine the values of *m* and *n*.

4. When $P(x) = x^3 - 3x^2 + kx + 2$ is divided by $x - 2$, the remainder is 4.

③ **a.** Determine the value of *k*.

② **b.** What is the remainder when $P(x)$ is divided by $x+1$?

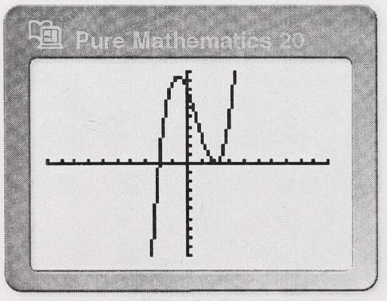
5. One of the zeros of $P(x)=6x^3-13x^2+x+k$ is 2.

③ **a.** Determine the value of k.

③ **b.** Write $P(x)$ in factored form.

④ **6.** Solve $x^3 - 3x^2 + 2 = 0$. Express your answers as exact values.

7. Alexa graphed $P(x) = x^3 - 2x^2 - 4x + 8$ on her graphing calculator.



③ **a.** Explain how she could use the graph to solve the inequality $x^3 - 2x^2 > 4x - 8$.

② **b.** What is the solution to $x^3 - 2x^2 > 4x - 8$?

㉕

Section 2 Assignment: The Algebra of Functions

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

1. Given $f(x) = x^2 - 4$ and $g(x) = 2x - 1$, determine the value of each of the following:

② **a.** $(f + g)(3)$

② **b.** $\left(\frac{f}{g}\right)(-1)$

④ **2.** Given $f(x)=x+2$ and $g(x)=x$, find the value(s) of x for which $(fg)(x)=8$.

④ **3.** A 0.5-kg ball is thrown vertically upward at a speed of 25 m/s. Its velocity, $v(t)$ (in m/s), at time, t (in seconds), is given by $v(t)=25-9.8t$. Its kinetic energy, $K(v)$ (in Joules), is given by $K(v)=0.5v^2$. Express the ball's kinetic energy as a function of time, $K(t)$.

4. Given $f(x) = x^2 + x$ and $g(x) = 2x + 1$, determine the following:

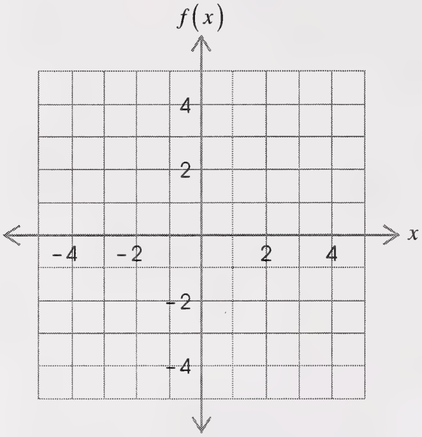
② **a.** $f(g(x))$

③ **b.** $(g \circ f)(4)$

5. Use the function $f(x) = 3x - 2$ to answer questions 5.a. to 5.d.

② **a.** Determine f^{-1}.

③ **b.** Graph both $f(x)=3x-2$ and its inverse.



① **c.** How are the graphs in question 5.b. related?

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② **d.** If $f(a)=4$, determine the numerical value of $f^{-1}(4)$.

(30)

Section 3 Assignment: Absolute Value, Rational, and Radical Functions

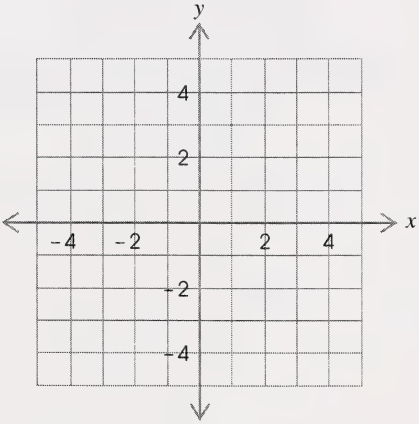
Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

(3)

1. Solve $|2x-7|=3$.

(4)

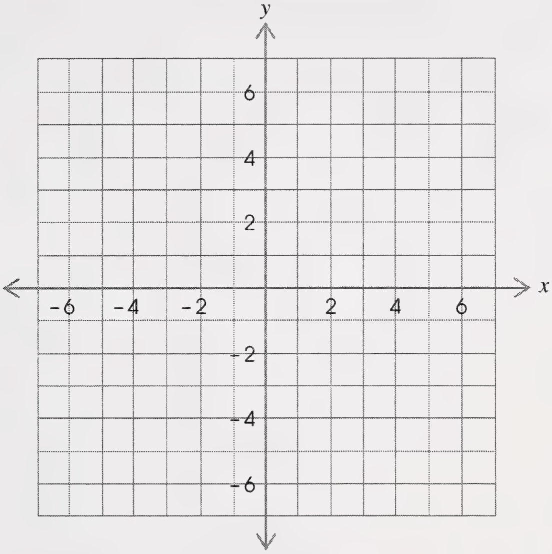
2. Solve $|x-3|=x+1$ graphically. Check your answer.



③ **3.** Solve $|2x-1| \le 9$; then graph your solution on a number line.

⑤ **4.** Solve $|x| \ge |x-3|$ using a graphing calculator. Outline the steps in your solution.

③ **5.** **a.** Graph $y = \frac{3}{3 - x}$.



② **b.** State the equations of the horizontal and vertical asymptotes of the function in question 5.a.

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⑤ **6.** Maurice drove 400 km from Edmonton to Battleford in one hour less time than it took Martin to drive the same route from Battleford to Edmonton. If Maurice drove 20 km/h faster than Martin, at what speed did each of them drive? Show a complete algebraic solution.

⑤ **7.** Solve $x = \sqrt{x+2} + 4$. Check your answer.

⑮

Final Module Assignment

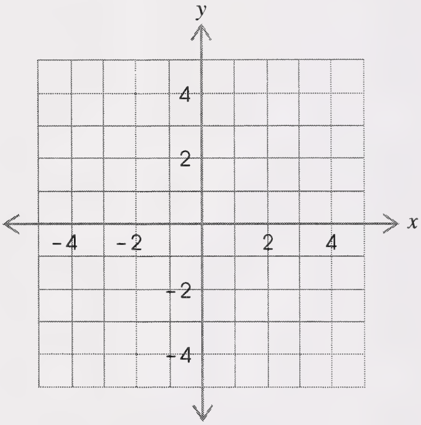
Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

④

1. Solve $x^2 - x \geq 20$ algebraically; then graph your solution.

② **2.** **a.** Find the inverse of $f(x)=x^2-2$.

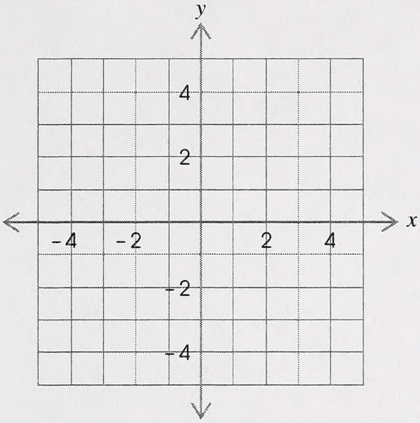
② **b.** Graph *f* and its inverse.



① **c.** Explain why the inverse of *f* is not function?

② **d.** Restrict the domain of *f* so that its inverse is a function.

② **3.** **a.** Graph $f(x)=\sqrt{x+3}$ and $g(x)=\frac{1}{x}$ on the grid provided.



① **b.** Explain how your graph can be used to solve $\sqrt{x-3}-\frac{1}{x}=0$.

① **c.** Using your graphing calculator, determine the solution to the equation in question 3.b., correct to the nearest thousandth.

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